

# INJECTION SURVEILLANCE COMMITTEE MEETING

April 27-29, 2009

U.S. EPA Building, San Francisco

## MINUTES

Attendees: ISC Members Rich Loverne, Steve Fields, Jim Carnahan, Burton Ellison, Glenn Muggleberg, Pam Ceccarelli, and Michael Stettner. Division guests: Ken Carlson, Grace Brandt, Anneliese Anderle, Fred Pineda, Pat Abel, Martha Miller, Josh Jones, Ali Khan, Jack Truschel, Michael Woods, Bill Winkler, Marilu Habel, Linda Campion, and Hal Bopp. U.S. EPA guests: George Robin, David Albright, Nancy Rumrill, Adam Freedman, Dave Basinger, Elizabeth Janes, and Michele Dermer.

### Monday, April 27<sup>th</sup>

#### **Welcome & Introduction (Stettner)**

Thank you to Dave Albright and the U.S. EPA staff for hosting this week's meeting. This meeting provides a great opportunity to share information and improve communication between the two agencies.

#### **1. Division/EPA Class II UIC Grant (Habel, M)**

- October 1 – September 30 is the federal calendar for the grant process
- Grant money for fiscal year 2009 is \$474,500
- The cost to run the UIC program is \$1.6 million
- 33 percent of the grant fund salaries and benefits for 4 positions
- Grant allocation is calculated on a formula that includes the number of Class II wells
- UIC Work Plan – the Division must complete a UIC workplan for each federal fiscal year
- The work plan describes how the Division will carry out the program and comply with conditions (quarterly report and universal of wells)

#### **2. Aquifer Exemption Policy (Albright, EPA)**

Albright discussed the purpose and criteria for an aquifer exemption. After a general discussion, he discussed the two types of aquifer exemptions, i.e., minor & major aquifer exemptions (see MOI 170.4).

##### **a. Purpose**

1. Criteria for exempted aquifers: 40 CFR 144.7 & 146.4
2. An aquifer exemption is a revision to the Division's UIC Class II program.
3. "Exemptions to protection" are EPA's highest priority and concern.
4. EPA considers the Aquifer Exemption Process to be an integration of both the Division and EPA programs.
5. No designation of an aquifer exemption is final until approved by EPA. See 40 CFR 144.7(2).

##### **b. Minor aquifer exemption**

1. Applies to an aquifer with a TDS greater than 3,000 mg/l ppm but less than 10,000 mg/l ppm.
  2. Operator makes case/application to the Division.
  3. The Division will deny or accept the application depending on criteria.
  4. If accepted, public review and RWQCB participation occurs.
  5. Early Division/EPA communication and information consultation is the key.
  6. The Division works with EPA on the details of the application to ensure all concerns are addressed.
  7. If approved by the Division, it is submitted to the EPA Region IX office.
  8. EPA has 45 days to deny or approved the aquifer exemption.
  9. Approval is automatically granted if EPA does not respond after 45 days.
- c. Major aquifer exemption
1. Applies to an aquifer with a TDS less than 3,000 mg/l ppm
  2. Same process as Minor aquifer exemption; however, it is:
    - a. A more involved process that takes 3-6 months
    - b. The Division approval is submitted to EPA Headquarters' office

**Note:** The Division and EPA will refine this new policy to replace policy in the MOI.

### **3. Division's Aquifer Exemption Process (Ellison)**

Ellison discussed the Asphalto oil field aquifer exemption application:

- a. Receive application, review, consult with EPA, deny/approve.
- b. Work with RWQCBs - not a current source of drinking water or public source of water, or won't be used as such in the future.
- c. Testing for TDS:
  1. Hard to find source
  2. Keep swabbing until same reading is received
  3. AAPG is providing a testing class this year at their convention
- d. Go to Public Review (Executive Summary handout provided and reviewed.)
- e. Go to Legal Notice, for 3 consecutive days in local newspaper, including Sunday, being very specific on area being published.
- f. 30 days for Public Comment Period.
- g. RWQCB notice can be concurrent.
- h. Send to RWQCB, local planning agency, and local water districts.
- i. Submit application to UIC Program Manager.
- j. UIC Program Manager develops letter for Supervisor signature approving the aquifer exemption.
- k. Letter defines lateral extent of the exempted aquifer.
- l. EPA makes final determination, either denial or approval.

Stettner's comments:

- a. Lateral extents of exempted aquifers were based on oil field boundaries.
- b. Establishing exempted aquifer boundaries - 40 CFR 144.7(b)(1)
- c. RWQCB defines freshwater by "beneficial use", not a particular TDS level.

- d. Pending aquifer exemptions: Three in D4 & one in D3.
- e. Local Water District or RWQCB must declare the aquifer is not a source of drinking water or public source of water, or won't be used as such in the future. Aquifer exemption boundaries were grandfathered when the Division received primacy
- f. When a field boundary that also defines the lateral limits of an aquifer exemption is changed, a revised aquifer exemption is required before injection can occur in the newly established area.
- g. EPA was posed with the question: What is the policy if this declaration is not made by either agency? **EPA will provide a response.**

#### **4. Santa Maria Aquifer Exemptions (Carnahan):**

- Wells drilled in diatomite for steamflood
- Diatomite needs is fracturing
- Problems with extracting fluids
- Does not meet the definition of an aquifer (40 CFR 144.3)
- No issues expected with water analysis
- TDS is 5,000 mg/l
- Discussed with operator and returned to the drawing board several times
- Started application process
- Presented to Stettner who took it to EPA for confirmation it does not meet aquifer standards

#### **5. Radio Active Beads (Carnahan)**

Carnahan discussed a couple issues regarding the use of radioactive tracer beads.

- a. Non-soluble, radioactive tracer beads
- b. Liquid radioactive tracers are not effective in high rate wells.
- c. The bead is designed to have the same density as the injection fluid so that it travels with the fluid when it is placed in the flow stream of an injection well.
- d. The bead does not enter the formation. It remains on the rock face in openhole, or within the perforation channel in cased hole, where it can be detected by a gamma ray log.
- e. A high radioactivity opposite a perforation indicates a large number of beads and hence a high injectivity.
- f. The problem is the survey company sometimes does not show up with the appropriate equipment required to inject the beads at surface, i.e., a load container w/ beads and a nitrogen bottle hook-up.
- g. Company had to resurvey several wells due to lack of equipment.
- h. Many variables can influence results.
  - 1. In small diameter casing/tubing, the rate can so high the fluid moves too fast to catch.
  - 2. The top perforation check is not reliable since the iodine will be diluted and move too fast.

#### **Recommendation:**

Should the regulations be amended to address a threshold rate when beads should be used? Generally, beads are used when the injection rate is equal to or greater than 5,000 bbls.

Suggested language:

CCR 1724(k)(8) To assure the desired plating effect when conducting an MIT using a radioactive isotope, the supervisor may require radioactive tracer flakes or beads.

#### **6. Project Review Questionnaire Revision (Abel)**

Annual project reviews should be conducted to determine, in part, whether the project is performing as expected, that all injection wells are classified properly and that the injected fluid is not causing damage to life, health, property, and natural resources. Each district should develop a plan to ensure annual project reviews are conducted. Reference: MOI Section 170.13.3

- a. Develop a consistent questionnaire form (without giving up the importance of face-to-face meetings).
- b. A handout with suggested questionnaire questions was provided. Subcommittee was formed to review all and revise the form. Subcommittee members: Loverne, Carnahan and Ellison.
- c. The questionnaire should be posted on the Division's website.

Subcommittee was formed to develop a Project Review Questionnaire and to recommend how often project reviews should be conducted (5 yrs?), face to face?, phone?, form?, etc. (Loverne, Carnahan and Ellison). The subcommittee will report their results as the next ISC meeting.

#### **7. MOI Update: Injection Well Testing (Abel)**

Pressure fall off tests and SAPTs were reviewed to confirm districts were using the same testing procedures.

#### **Recommendation:**

##### Pressure fall off:

A proposed guideline was discussed that would provide consistency among districts. The intent is to ensure that an injection zone is kept at or below hydrostatic and should be potentially required of any injection well regardless of the injection well type.

##### Proposed Guideline:

1. No test required for wells that inject on a vacuum or less than 50 percent of MASP.
2. An annual test is required for wells that inject at or above 75 percent of MASP.

##### SAPT:

A standard annular pressure test is required prior to injection or every time a packer is reset and at least once every five years for both waterflood water disposal and waterflood wells.

The Division requirements for an SAPT are a minimum final test pressure of 200 psi, a minimum stabilization time of 15 minutes, and a maximum pressure loss of 10 percent of the initial test pressure. The pressure must stabilize for 15 minutes without any pressure drop. (See handout)

**Tuesday, April 28<sup>th</sup>**

## **8. UIC Data (Janes, EPA)**

- Purpose: EPA to access Division data
- There are currently 70 UIC National programs
- Security – only available to EPA
- There appears to be a translation problem with DC and the Division
- Additional funding will be needed for conversions for the mapping
- EPA to carry feedback to their Headquarters office in DC
- Possibility of a contractor paid by EPA HQ to conduct work for the Division

## **9. MASP Query (Abel)**

- Can HQ generate monthly
  - Perhaps on 110B's
  - HQ to distribute to districts on a monthly basis
- Need to ensure field staff is aware of MASPs
- Ensure the Division surveillance is timely
- Add friction loss in gradient calculation
- Fields has query to check MASP and will share with districts

## **10. Angus Drill Site Proposed EOR Project – Springfield Area, Huntington Beach (Loverne)**

Loverne discussed a proposal to activate an EOR project in the Springfield Area, Huntington Beach oil field. The drill site has been idle since 1998 and a new operator has acquired the lease. The Division reviewed the operator's proposal and determined that improperly plugged and abandoned wells will be exposed to pressures over hydrostatic. As a result, the Division is not comfortable with the operator's proposal but has yet to make a final determination. The lease is in an urban environment.

Loverne's powerpoint presentation is saved to the Division's R:HQ/Powerpoint folder.

## **11. Lease Rainwater (Carlson)**

- a. Operator is seeking approval to inject rainwater collected within tank batteries.
- b. Would like to avoid having to provide a fluid analysis.
- c. Regional Quality Control Board is asking who has control and do they have approval.
- d. Federal RCRA exemption allows injection of rainwater into Class II wells.
- e. California DTSC does not recognize RCRA exemption.
- f. Carlson to provide Stettner with further details.
- g. Stettner will compose a formal response to EPA requesting rainwater be considered a Class II-type fluid.

## **12. Rescinded vs Terminated (Loverne)**

- a. The MOI interchangeably uses the two terms.
- b. Terminated is considered completed, done, or come to an end.
- c. Rescinded is used to make void; repeal or annul.

- d. Either term denotes injection can no longer occur.
- e. Stettner: "How do you rescind injection into an individual well since a permit to inject is technically not issued?"
- f. Stettner will make an MOI fix and provide at next meeting.

### **13. Injection Reporting: NPB vs. Pool Code (All)**

General discussion regarding the proper coding of injection pools. MOI 116.4 was referenced. For EDP purposes, proper coding for new pools should be accomplished as soon as injection commences. A key ingredient of any waterflood monitoring and surveillance program is accurate data collection. Collecting accurate injection volumes is essential to understanding and forecasting waterflood and water disposal project performance. Production testing, production plots, cut-cum graphs, transient pressure testing, injection profile management, pattern balancing, volumetric calculations, etc. are dependent on accurate data collection.

Consolidating waterflood projects into one project is not an action the Division should normally condone unless past practices allowed zonal communication. Generally, good reservoir management includes maintaining reservoir separation so as to obtain a high economic recovery and to generate accurate reserve estimates. Allowing comingling of separate and distinct reservoirs makes it difficult if not impossible to determine whether waterflood projects are indeed enhancing oil recovery or to estimate the reserves accurately.

When an injection reservoir is coded as NPB, volume data should be obtained during annual project reviews.

### **14. RAT – Minimum Standards (Loverne)**

General discussion on how the Division conducts Radioactive Tracer Surveys. The districts were queried to determine if any differences exist. Miller discussed the MIT guidelines D4 provides operators and service companies (see handout). M13 was referenced and Stettner discussed expanding MOI 170.14 to include standard procedures will write about the need to know where the water is going.

### **15. Project Folder Organization (Stettner/All)**

This was just a general discussion to determine how districts keep and organize their UIC well and project data. Project folders should be organized so that all materials associated with the project are contained within the appropriate project.

The policy of retaining an injection well's last three MITs was raised.

## **16. Area of Review (Stettner)**

Stettner emphasized the primary concern of the UIC program is the potential for fluids from the injection zone to escape the approved zone due to the presence of conduits or other pathways. An area of review (AOR) is conducted to determine whether conduits or pathways exist that could have an adverse effect on the project or cause damage to life, health, property, and natural resources. The AOR could be considered the “Area of Most Detailed Study,” or the “Area of Greatest Concern” regarding a UIC permit. Operators are required to submit casing diagrams for all wells within the AOR affected by the project that include the location of cement plugs and the actual or calculated cement fill behind the casing.

Although injection projects were permitted before the Division received EPA primacy and the calculated or fixed radius of one-quarter ( $\frac{1}{4}$ ) mile was established, approval was based, in part, on an evaluation of wells that could be affected by the injection project (area of influence) to ensure the injected fluid is confined to the approved zone. The Division/EPA Memorandum of Agreement that empowers the Division to carry out the terms of the UIC program as listed in the primacy application for Class II wells and to enforce SDWA requirements redefined the “area of influence” to mean a calculated or fixed radius of  $\frac{1}{4}$  mile.

The granting of Class II primacy also means that the Division must carry out the requirements of the Safe Drinking Water Act (SDWA). By accepting the responsibility of enforcing SDWA, the Division had to ensure AORs are conducted for all injection projects, including pre-primacy projects, and that SAPTs are conducted for every injection well every five year. Each district should also ensure that all necessary engineering and geologic data is obtained for each injection well and project.

After all the data is obtained for each project, a complete review of all injection projects should be conducted to ensure all UIC requirements and Division mandates are met. This includes making certain AORs are completed and evaluated for every injection well to determine whether any conduits or pathways exist that would allow injected fluid to migrate out of the injection zone. For any well considered to have improper construction or plugging and abandonment conditions, a corrective plan or monitoring plan should be established to assure injected fluid is not migrating out of the approved zone.

Requiring AORs for pre-primacy injection projects was initially discussed at an ISC meeting in 1986. This ISC recommendation was submitted for review at the succeeding Deputies Conference, which the Deputies approved.

To accomplish this task, districts raised the concern that more man-power may be needed. However, there is no set time limit for completion. It was also mentioned that if each district began this process in 1986 it would not be an issue today.

Stettner cautioned everyone to be proactive, recognize there may be short-comings with old projects, possible objections from operators, and to use good engineering judgment to resolve project compliance issues.

During the AOR discussion, it was pointed out that the volumetric equation in the MOI on R: Drive is incorrect. Stettner will make the correction before next meeting.

#### **17. Step Rate Tests (Stettner)**

Stettner discussed the Division's procedure for conducting step rate tests and will add these procedures to the MOI for review at the next meeting.

**Wednesday, April 29<sup>th</sup>**

#### **18. Monitoring, Testing and Inspections(Stettner/All)**

Stettner discussed this topic to remind UIC staff that the Division/EPA Work Plan outlines goals for monitoring, testing and inspection. This was followed by a general discussion of district methods for achieving those goals.

Monitoring procedures for each district was discussed.

D1:

- Run their own query
- Operator submits data and coordinates with idle well engineer
- For observation wells, pressure monitoring is used, fluid levels
- Temp surveys are read by idle well engineer
- Shut-in and monitor rising fluid from bottom up

D4:

- Observation and monitoring wells (2 types)
- Various methods used for both
- Surveys every three years and required to provide data
- Static temps for observation wells and pressure and temps for some

Geothermal:

- Observation survey is conducted every month for monitoring.

All districts' use the same terminology:

- Observation: monitor enhanced recovery project (set up by operator)
- Monitor: we require them to monitor for problems
- We keep track of surveys/reviews
- We can require the frequency of monitoring surveys on the permit (quarterly, yearly, etc.)
- Tests run by operator must provide a copy to the Division
- Are districts teaching/training staff (EMRE's and Tech's) to ready surveys?
  - D4 – Yes, D2 – No, D3 – Yes (electronically)
- Monitoring water disposal wells in the field? (Environmental Inspections)
  - Documenting every inspection? Paper copy only, not on computer.
  - Gages/regulators are not reliable and not mandated to have permanent ones on site



- Send monthly due letter for injection wells, if not done, they are rescinded
- Submit last test (read-out) for observation wells. Operator to maintain records in case we request them
- Monitoring wells – mostly temperature reporting. Operator to email monitoring monthly.

#### Injection Surveys:

- Lack of service companies
- Big problem in D2
- Makes them more lenient
- D3 – Small operators are encouraged to partner with other small operators so that they only have to pay for one trip-charge for a survey truck

#### Inspections:

- Water Disposal – one year
- Waterflood – two years

D1: Quality of inspections has declined because of amount of workload on field staff

D4: Not occurring now but very thorough covering distance

D5: Behind on inspections

### **19. Safety Equipment Regulations for H<sub>2</sub>S:**

- The Division needs to create regulations so that we can enforce requirements
- CalOSHA – good source to emulate

### **20. Lap tops:**

- Used mostly in field
- Mounts have been ordered for ease of use
- Need to adopt vehicles
- Helps with immediate electronic availability and immediate reporting
- Needs to be uniformed and user-friendly

### **21. Well File Review:**

- Numbers reported need to be accurate
- Conducted every five years

### **22. Miscellaneous:**

#### Albright:

- CO<sub>2</sub> Regulations – EPA proposed new wells, to comment in the Fall
- Issue a “notice of data availability”
- Make available certain studies in the Spring
- Before final ruling, give public chance to comment on the new studies
- All comments and regulations are on the web.

Basinger:

- BOP testing – wants to go out in the field with the Division staff to learn about our standards for safety
- Ceccarelli will be the contact person for Dave

D4: Illegal injection Civil Penalty issued. Operator admitted his wrongdoing and paid the fine.

Stettner is considering rewriting UIC Regulations and is seeking any suggested changes.

Plaques of appreciation were presented to Pat Abel and Ken Carlson for their participation and contributions while serving the ISC. Tim Kustic was not in attendance but will be presented with his award in Sacramento.

Glenn Muggleberg has enthusiastically agreed to be the committee's new Chair.

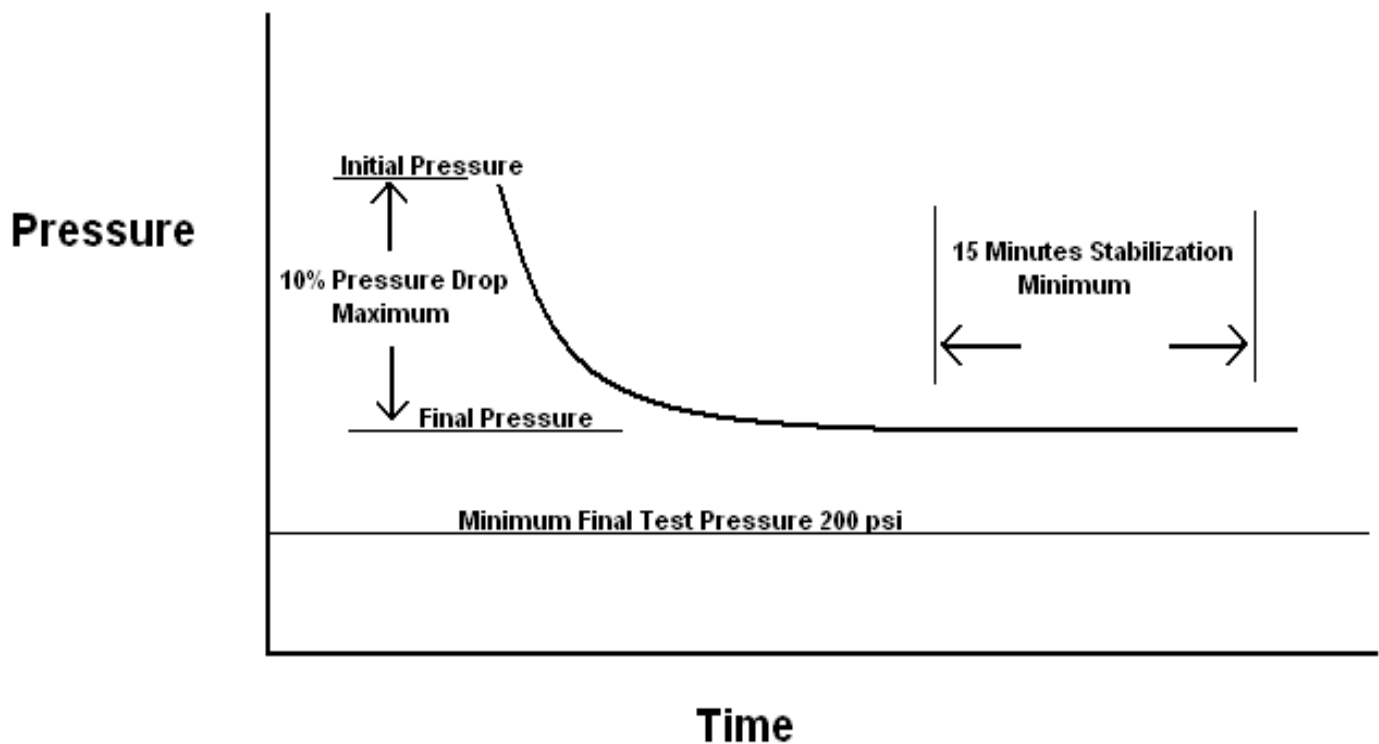
The next meeting will be planned during the first part of September.

# Standard Annular Pressure Test (SAPT) Requirements

A standard annular pressure test is required prior to injection, every time a packer is reset, and at least once every five years for both water disposal (WD) and waterflood (WF) wells.

The Division requirements for an SAPT are a minimum final test pressure of 200 psi, a minimum stabilization time of 15 minutes, and a maximum pressure loss of 10 percent of the initial test pressure. These standards are represented graphically below:

**Graph of an SAPT - Pressure v. Time**



## **DIVISION OF OIL AND GAS DISTRICT 4**

### **GUIDELINES FOR OPERATORS Mechanical Testing Procedures and Presentations**

The District's surveillance of injection operations increased due to the enactment of Federal and State legislation. To provide operators and service companies with a better understanding of the criteria for mechanical integrity tests, the following guidelines will present information on: A) Pre-testing, B) Basic Testing Procedures, and C) Proper Presentation Format.

#### **A) Pre-test Data**

1. Tubing pressure
2. Casing/annulus pressure
3. Flow rate at time of test
4. All pertinent casing and tubing information: size, weight., depth of the tubing, depth of the packer, perforation interval, pick-up
5. Equipment and material used
6. Test engineer
7. Operator representative
8. Division representative

#### **B) Basic Test Procedures and Testing Guidelines**

1. Tests shall be run with the casing/annulus valve open, unless a tubing/packer variance has been granted.
2. For wells with tubing and packer, dynamic temperature surveys should be run from at least 200 feet above the packer to the TD.
3. Static temperature surveys should be conducted the entire length of the well when required.
4. Casing collar logs should be run at least 200 feet above the packer to T.D. For wells without a tubing/packer a casing collar log should be run from 200 feet above the top perforation to TD.
5. Background logs should cover the interval to be surveyed.
6. Electronic sensitivities should be set so that initial tracer peaks measure at least 1 inch in height on a standard recording chart.
7. Radioactive tracer tubing rate, "drop" checks, should be run within 200 feet of the top and 200 feet the bottom of the tubing.
8. "Drop" checks for wells without tubing/packer should be run as close as possible to the top perforation and within 200 feet of the top of the well.

9. Wells with injection rates: a.) less than 300 b/d should have a waiting time after initial tracer slug release of not less than 300 seconds, b.) 300 – 1000 b/d should have a waiting time of not less than 120 seconds.
10. Spinner rate checks cannot be substituted for radioactive velocity/rate checks for wells with injection rates below 1,000 b/d.
11. Radioactive beads should be used on all wells with an injection rate greater than 5,000 b/d.
12. A Division representative must be notified 24 hours in advance to witness mechanical integrity test on all water injection wells and gas disposal wells. Note: notification is *not* needed for testing of steamflood wells.
13. Operator representatives are responsible for notifying Division personnel of any upcoming test.

### **C) Presentation Format**

1. All pre-test well conditions and test data should be displayed on the surveys.
2. All Spinner, temperature, casing collar, and background surveys shall be displayed.
3. All velocity/rate checks and top perforation/packer checks shall be displayed.
4. Any anomalous results (i.e., temperature breaks, background kicks, potential leaks/holes....) should be explained.
5. Supportive data (i.e., fluid level, pressure fall-off, etc.) should be addressed and/or displayed.

Any exception to the above procedures should be addressed with district personnel prior to running surveys.

If you should have any questions concerning the aforementioned material please contact this office at (661) 322-4031.